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ABSTRACT

Science and technology are at their peak, but humanity is still unsure about them, and still struggling, resulting in a "human gap." Most learning is designed to maintain the status quo ("maintenance learning"), when it should be directed at coping with and managing change ("innovative learning"). Learning, if directed towards enhancing individual and societal anticipation and participation, will be an indispensable prerequisite in preparing humanity for its own future. Innovative learning has two parts: the anticipation of problems, and problem solving. Speculations on the obstacles in the way of widespread acceptance of innovative learning and what to do about those obstacles are presented. (SAS)

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Education and Global Problems

A Note of Cautious Hope

by James W. Botkin

The latest report to the Club of Rome, entitled No Limits to Learning: Bridging the Human Gap, sounds a note of cautious hope that human potential, consciously cultivated through new forms of learning and education, can lead to significant improvements in the presently deteriorating human condition.

The report views learning "globally"--i.e., all-encompassing and worldwide. It discusses both conscious and unconscious learning processes occurring through schools, media, work, family, and throughout society. It considers the problems and opportunities for learning in the industrial countries (the so-called "North"), where schooling and media have grown to huge proportions, and also in the developing countries (the so-called "South"), where traditional learning was and is still being indiscriminately abandoned.

The authors criticize the widespread tendency to rely on "learning by shock," which in the context of global issues is a formula for disaster. Instead of largely unconscious adaptation to crises and events, the report pleads for conscious anticipation of diverse and desirable futures. To achieve this fundamental shift will require what the authors call "innovative learning"--preparing people to act in concert in new, possibly unprecedented, situations. Elementary and secondary schools, in America as elsewhere, have a key role to play in this preparation.

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In contrast to innovative learning, schools and the media are dispensing "maintenance learning"--the learning of fixed rules for

recurring situations which may be necessary but will be insufficient for a future increasingly characterized by global problems. Indeed, the sole reliance on maintenance learning is blocking the emergence of innovative learning and by consequence leading inevitably and unacceptably to learning by shock.

The report examines the role of values and human relations, of power and institutional rigidities, and of irrelevance and waste in preserving and propagating a maintenance learning syndrome in systems of education. The authors refuse to consider a "world blueprint for educational action," insisting that each society will have to develop its own paths to innovative learning. They do, however, offer some illustrations--concerning ethical dimensions to literacy and functional illiteracy, relating elementary and secondary schools to the world of work, the role of the university, integrative programs for the media, and new proposals for international, interdisciplinary research in learning. These demonstrate the two key criteria comprising innovative learning: Anticipation and participation.

The product of three research teams from first, second, and third worlds and written by James W. Botkin (USA), Mahdi Elmandjra (Morocco), and Mircea Malitza (Romania), the report was presented to the Club of Rome in June, 1979 in Salzburg, Austria, and has just been released in English by Pergamon Press, Oxford, England. Versions in German and Spanish have also appeared, and others in Japanese, Arabic, French, Finnish, Italian, and Dutch are in progress. What follows here is a synopsis of some of the main ideas the learning report to the Club of Rome as formulated by its American co-author, James Botkin.

Condition: The Emergence of a World Problematique and a Human Gap.

Humanity is entering a period of extreme alternatives. Unprecedented human fulfillment and ultimate catastrophe are both possible. Scientific and technological advancement have brought unparalled benefits, knowledge, and power--yet people today seem unable to grasp the meaning of their actions, leading to personal, societal, and global confusion. This incapacity to cope with currently accelerating rates of change is the root meaning of "human gap."

The gap is the distance between growing complexity and our capacity to cope with it. It is a human gap, because it is a dichotomy between an accelerating complexity of our own making and a lagging development of our own capacities.

This vulnerable situation is magnified by an equally alarming problem--the emergence and acceleration of a "world problematique," identified nearly a decade ago by the Club of Rome as an enormous tangle of problems in sectors such as energy, population, and food which confront us with unexpected complexity. While the techno-scientific enterprise has made some progress in addressing these global issues, its efforts are neither systematically nor globally coordinated. Seldom if ever is our vast assortment of resources mobilized across academic disciplines and national boundaries toward pursuit of common global goals on a long-term basis. The few existing evaluations or forecasts are narrow, fragmented, or short term. As a consequence, humanity remains pitifully unprepared to cope with formidable challenges on the immediate horizon, and the overall human condition contuinues to deteriorate.

The Role of Learning and Education

Whether this deteriorating situation can be reversed depends on another major--and decisive--factor: Human learning. It will take new forms of learning to help bridge the human gap by mobilizing our understanding and actions in order to come to grips with the world problematique.

"Learning," as used here, has to be understood in a broad sense. It is taken to signify a whole approach, both to knowledge and to life, that emphasizes human initiative. It may occur consciously, or even unconsciously, usually from experiencing real-life situations, although simulated or imagined situations can also induce learning. Probably every individual in the world, whether schooled or not, experiences the process of learning--and probably none of us at present are learning at the levels, intensities, and speeds needed to cope with the complexities of modern life. Thus learning goes beyond what conventional terms like "education" and "schooling" imply. This is not to ignore formal education but to stress the important, sometimes predominant, role of the other factors inherent in the learning process.

Those concerned with education must face a stark reality. Conventional schooling--a huge enterprise which directly occupies ' e of every six inhabitants of the planet and is supported by over $400 billion annually--has failed to prevent deterioration in the human condition and indeed is contributing to a widening of the human gap.

This was not always so. History shows that in the past, human learning has been largely successful. Throughout its cultural evolution, humanity has adapted to its environment, successfully if

often unconsciously shaping its surroundings in ways that ensured survival of the species and that gradually increased the well-being of larger and larger numbers of its kind.

Maintenance, Shock, and Innovative Learning

Today, serious doubt must be raised as to whether conventional human learning processes are still adequate. Traditionally, societies and individuals have adopted a pattern of continuous maintenance learning interrupted by short periods of innovation stimulated largely by the shock of external events. Maintenance learning is the acquisition of fixed outlooks, methods, and rules for dealing with known and recurring situations. It enhances our problem-solving ability for problems that are given. It is the type of learning designed to maintain an existing system or an established way of life. Maintenance learning is, and will continue to be, indispensable to the functioning and stability of everyday society.

But for long-term survival, particularly in times of turbulence, change, or discontinuity, another type of learning is equally essential. It is the type of learning that can bring change, renewal, restructuring, and problem reformation--and which can be called innovative learning.

Throughout history, the conventional formula used to stimulate innovative learning has been to rely on the shock of events. Sudden scarcity or catastrophe have interrupted the flow of maintenance learning and acted--painfully but effectively--as ultimate teachers. Even up to the present moment, humanity continues to wait for events and crises that would catalyze or impose this primitive learning by shock. But under current conditions of global uncertainty, learning by

shock is a formula for disaster.

The conventional pattern of maintenance/shock learning is likely, if unchecked, to lead to one or more of the following consequences: (a) The loss of control over events and crises will lead to extremely costly shocks, one of which could possibly be fatal; (b) The long lag times of maintenance learning virtually guarantee the sacrificing of options needed to avert a whole series of recurring crises; (c) The reliance on expertise and short time periods intrinsic to learning by shock will marginalize and alienate more and more people; (d) The incapacity quickly to reconcile value conflict under crisis conditions will lead to the loss of human dignity and of individual fulfillment.

The net result of following any of these paths is that humanity persistently will lag behind events and be subjected to the whims of crisis. The fundamental question that this prospect raises is whether humanity can learn to guide its own destiny, or whether events and crises will determine the human condition.

A Conceptual Framework for Innovative Learning

The main purpose of this report to the Club of Rome is to initiate debate on learning and the future of humanity centered around the concept of innovative learning and its chief features. We do not assert that innovative learning by itself will solve any of the pressing issues. What we do assert is that innovative learning is a necessary means of preparing individuals and societies to act in concert in new situations, especially those that have been, and continue to be, created by humanity itself. Innovative learning is an indispensable prerequisite to resolving any of the global issues. This is not to say, however, that other actions involving political power,

technology, economics, and so on will not also make instrumental contributions--although innovative learning needs to underlie and penetrate these and other actions as well.

Innovative learning consists of two key elements: anticipation and participation.

Anticipation is the capacity to face new, possibly unprecedented situations; it is the acid test for innovative learning processes. Anticipatory learning stresses preparation for future alternatives, not adaptation to the present. Indeed, it goes beyond foreseeing or choosing among desirable trends and averting catastrophic ones: It is also the creating of new alternatives. Anticipation involves imagination, but it is equally based on hard fact. In non-anticipatory, adaptive learning, all we do is "react," delaying the search for answers until it may be too late to implement solutions. Under the influence of maintenance learning, those who are alarmed are not moved by gradual deterioration. Then, when shock occurs and events roll like thunder, people finally stand up to look for the lightning that has already passed.

Participation is a term that powerfully and controversially evokes the idea of the individual's and people's aspirations to be partners in the decision-making, to strive for equality, and to reject unduly limiting roles. The demands for participation have become nearly universal and are being felt on every level from local to global. Nation states, especially in the Third World, are demanding to participate on an equitable basis in the world decisions that affect them--particularly on policies concerning global issues. Groups of every definition are asserting themselves around the world and renouncing marginal positions or subordinated status with respect to

power centers. Rural populations are aspiring to urban-like facilities; factory workers seek participation in management; students and faculties demand a voice in administering important school policy; women are demanding equality with men. It is the age of rights and significantly not yet the age of responsibilities. An intrinsic goal of effective participation will have to be an interweaving of the demand for rights with an offer to fulfill obligations.

If participation is to be effective, it will be essential that those who hold power do not block innovative learning. A major task of learning in the next decades will be learning how to participate effectively. For in too many instances, "participation" as we know it today is in crisis. Some participants are more skilled at blocking proposed plans than they are at formulating constructive alternatives. Too much participation is short-sighted, which may produce counter-productive results when anticipation is lacking.

Yet not "participating"--remaining apathetic instead of empathetic or closed rather than communicative--makes one part of the problem. We are at the end of a time when decisions could be handed from the top down. A critical mass of people on an unparalleled world scale will have to work together, not so much to "solve" global issues as to generate a common understanding of them and a shared will power to address them. Activating the latent potential of innovative learning present in the world system hinges largely on the degree of effective participation at international, national, and local levels.

dignity. To put human survival at the forefront as the first purpose of learning signifies that this is not a metaphysical question; rather, learning has become a life and death matter. But survival at any price is not a sufficient ideal or cause. One must go beyond

"submitting in order to survive." Human dignity is designated as the "beyond survival" goal. If dignity is a broad term with many meanings, it is taken here to stand for self-respect, for mutual respect for individuals in culturally diverse societies, and for the respect accorded to humanity as a whole.

Causes and Consequences of Blocking Innovative Learning

There are many reasons why anticipatory and participatory learning is blocked and prevented from asserting its proper influence. First and foremost is the misuse of power, the best example of which is the arms race. Not only are financial resources immobilized when sixty times as much is spent on training each soldier as on educating each child, but intellectual resources are being diverted from constructive to "defensive" uses as well. Nearly half of all the scientists in the world are engaged in military related research, which consumes more public resources than all the research on education, health, energy, and food combined. The secrecy and distrust intrinsic to the military "mystique" inevitably infects our learning. For example, when information and data about communications, policies, energy plans, food reserves, or population trends cannot be discussed openly, learning processes are clearly impeded. The military image evidently has as strong a hold over our minds as its command of money and power has over our public resources.

The present neglect and misuse of television is another case of opportunities lost to enhance innovative learning. The worldwide "commercialization" of television--both the advertising/propaganda aspects of many TV programs as well as the indiscriminate importing of cheap, inappropriate, and largely outdated shows--is promoting a

learning of the most stultifying maintenance type. The case of television is instructive, for it shows that the type of learning stimulated by a communications technology depends more on the structure of the industry than on the capabilities of the technology. At present, we stand on the verge of a virtual revolution in "telematiques," that goes far beyond television. Filled with technological possibilities for learning heretofore unimagined, the benefits of the telectronics revolution will be lost if we fail to seize these fleeting chances to harness such technologies for constructive innovative purposes.

There are other, more subtle, blockages to innovative learning. One is our conceptions--or misconceptions--of learning itself. Two of the sciences destined to influence our thinking profoundly are biology and cybernetics. Dramatic developments in fields like genetic engineering and artificial intelligence will provide not only an escalating increase in knowledge and power, but will bring with them certain, often implicit, implications for learning. Biology, for example, stresses a model of adaptive learning. In describing evolution, some claim that the success of survival and penalty of extinction could be counted as lessons learned or missed. But the adaptive model is an expensive one: Of the two billion species which at different times existed on earth, only two million are alive today.

Cybernetic models of learning likewise have their pitfalls. Values are all too often frozen into cybernetic models, or relegated to the level of mere facts. But the importance accorded to the role of values is what delineates innovative from maintenance learning. Moreover, computer modeling stresses problem-solving. We have become experts, it seems, at solving problems within a given set without

developing an equal ability to foresee and identify problems beyond the immediately familiar horizons.

The major consequences of blocking innovative learning are irrelevance and waste. The long lag times associated with maintenance learning virtually guarantee the obsolescence of children before they become adults. In Third World countries which have carbon copy systems of industrial education, the irrelevance is doubly serious.

The waste of human learning potential is even more pronounced. To cite just two examples, the case of women and the problem of the rising number of illiterates is symptomatic of the increasingly unbalanced and despairingly inert system of education preoccupied with maintenance learning.

The few exceptions to this maintenance system of schools, media, and social rigidities seem to be found not in the conventional systems of society but in the newly emerging constituencies forming around international non-governmental organizations. The "NGOs," as they are known, probably have been the most successful in promoting innovative learning of the anticipatory and participatory type.

Illustrations of a New Learning Perspective

While the processes by which humans learn is universal, the specific ways and means to improve learning will depend on the cultural context, where encouraging diversity is the key. No undifferentiated blueprint for a world program of learning is either feasible or desirable. Thus this report to the Club of Rome limits itself to several illustrations. Five are suggested:

(1) Literacy: To add an ethical dimension to "literacy," at the same time renewing efforts to eradicate illiteracy as conventionally

defined. With the number of adults unable to read and write approaching one billion, it is unthinkable and unfair to ask them to share in the burdens of world issues. Yet they are the first to suffer food shortages, and are increasingly asked to "participate" in family planning schemes.

Rather than limiting illiteracy to this conventional view of the Third World, people who, although unable to read and write, may have highly developed ethical standards, a wider view which includes an ethical dimension to literacy would more accurately reflect why the human condition continues to deteriorate. Despite the difficulties inherent in articulating new measurable standards, efforts should be made to conceive of literacy as a means of increasing people's ethical and effective participation.

(2) School and life: To arrange for every child to be engaged on average, one day per week outside the school. The schools' goal of preparation for life has turned to separation from life. One way to overcome this is for children to get an exposure to the world of work in order to increase relevance and to participate in as many diverse contexts as feasible. At least by age 12, children who had spent full time at school should be given appropriate duties in enterprises, service centers, research institutes or in public or community service organizations. Of course, strict precautions would have to be taken to avoid misuse of the program to exploit child labor.

(3) University and society: To involve university students more directly in the developmental projects of society. Who, for example, in the developing countries is better placed than the universities to develop literacy programs? Could not the students be given credits equivalent to two semester courses if they make ten persons literate by

the end of the academic year? Such programs need not, of course, be limited to literacy. They could apply to any of the areas such as environmental protection, preservation of the cultural heritage, water resources, health and sanitation, land conservation, and so on. While we recognize the need for universities to balance action with reflection, a majority of the world's 5,000 universities and 40 million university students have become too remote from the reality surrounding them.

(4) Mass media and the future: To devise programs that encourage integrative thinking. Every effort should be made to prepare for the extraordinary communications and man-machine dialogue which developments in "telematiques" and "telectronics" are bringing. At least a third or more of efforts in this field should be devoted to educational programs that encourage innovative learning and, more specifically, integrative and holistic thinking. An ombudsman should monitor for a sufficient number and quality of programs appropriate to each country.

(5) Learning research: To establish an international interdisciplinary program of research on learning. The challenge is by the end of the century to achieve breakthroughs that would enhance our presently fragmented, incomplete, and inadequate knowldege of how learning works. The two cornerstones of this undertaking could be neurophysiological brain research and socio-psychological research--with both according due weight to cultural and pedagogical implications of learning. This program could be similar to ones which UNESCO has undertaken for the biosphere (MAB) or for scientific and technological information (UNISIST). This initiative could be launched in several parts of the world at once, and care should be taken to uncouple the program from

the constraints of excessive bureaucracy.

Concluding notes

Learning, if directed more toward enhancing individual and societal anticipation and participation, will be an indispensable prerequisite in preparing humanity for its own future. This is a positive sign, for it indicates that human potential can be guided toward improving the human condition. Thus we conclude on a note of optimism: For all practical purposes, there seem to be no limits to learning--even though in a theoretical sense some absolute limits surely must exist. But the optimism must be tempered by caution. While the theoretical limits, if any, to human potential do not seem to come into question presently, there is still a very real question whether innovative learning will be allowed to play the role it could and should.